A Basin Wide Great Lakes Coastal Wetland Monitoring Program:

Invasive Species

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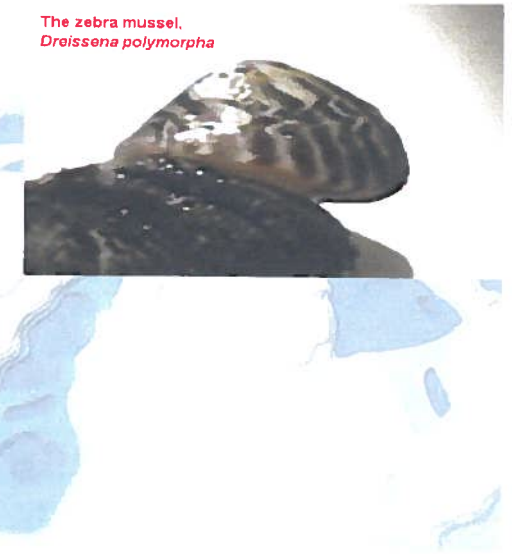
Threats to the Great Lakes

» Estimated 180+ exotic species present today

» Receive a new exotic species every 8 months

» Impacting food web and fishery drastically

» Total Economic Loss due to invasive species estimated at $ 5 billion per year in 2005.


The zebra mussel, *Dreissena polymorpha*

Invasive Species in Lake Michigan Alone

» Estimated 330 Trillion Zebra and Quagga Mussels

» Each Filter 1 L of Water Per day

» Undermining Energy Base for Juvenile Fish

» Estimated 10 Million Pounds of Round Gobies

» Representing 25% of the Prey Fish

The zebra mussel,
Dreissena polymorpha

Presentation Outline

- Introduce Current $10M Basin-Wide Monitoring Project
- Examples of Results to Date
- How Our Project is Contributing State and Federal Databases
  - Distributions of Invasive Species

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Great Lakes Coastal Wetland Monitoring Project

- Developing and Publishing Measures of Ecosystem Health Since Late 1990s
    - Collect Chemical, Physical, and Biological Data
    - Apply Mathematical Models to These Data
    - Quantify 'Wetland Health'
- These Standardized Methods are being used in 8 States and 2 Provinces.

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Great Lakes Coastal Wetland Monitoring Project

» GLRI- USEPA GLNPO RFP for $10M

- Monitor All Coastal Wetlands using our Methods

» Awarded in 2010 to CMU (Uzarski et al.)

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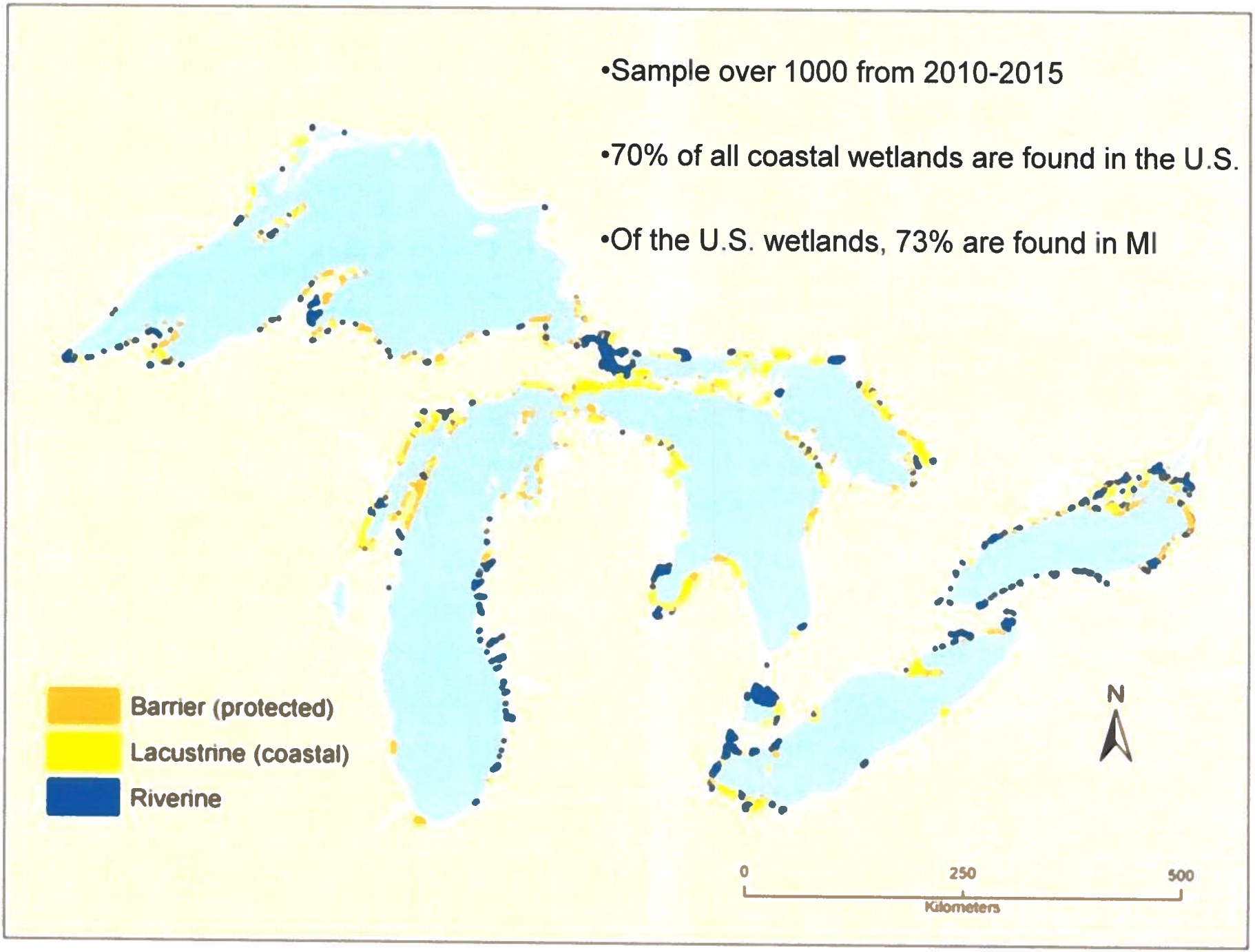
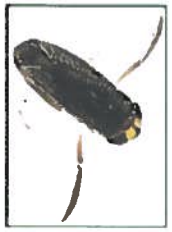

•Sample over 1000 from 2010-2015
•70% of all coastal wetlands are found in the U.S.
•Of the U.S. wetlands, 73% are found in MI
Barrier (protected)
Lacustrine (coastal)
Riverine
N
0
250
500
Kilometers

Current Research Measure Ecosystem Health

~1039 Coastal Wetlands



- Chemical/Physical Uzarski et al. 20
- Invertebrates Uzarski et al. 2004
- Fish Uzarski et al. 2005
- Plants Albert 2008
- Birds Howe et al. 2013
- Amphibians Howe et al. 2013
- Landscape Bourgeau-Chavez et al. 2008

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Quantify Ecosystem Disturbance

- Extremely Degraded: (0 to 15% of possible score)
- Degraded: (>15 to 30% of possible score)
- Moderately Degraded: (>30 to 50% of possible score)
- Moderately Impacted: (>50 to 70% of possible score)
- Mildly Impacted: (>70% to 85% of possible score)
- Reference Conditions: (>85 to 100% of possible score)

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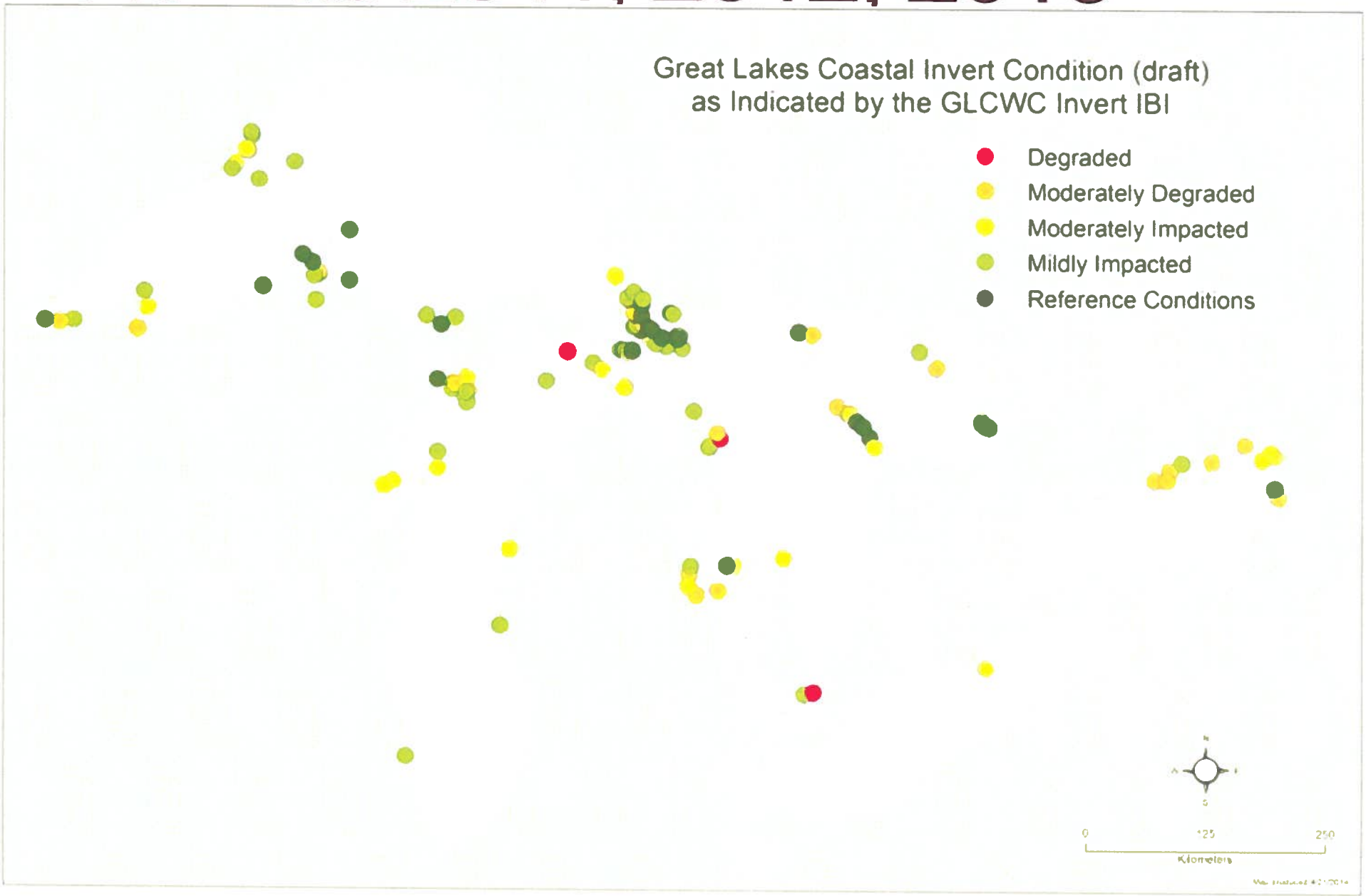
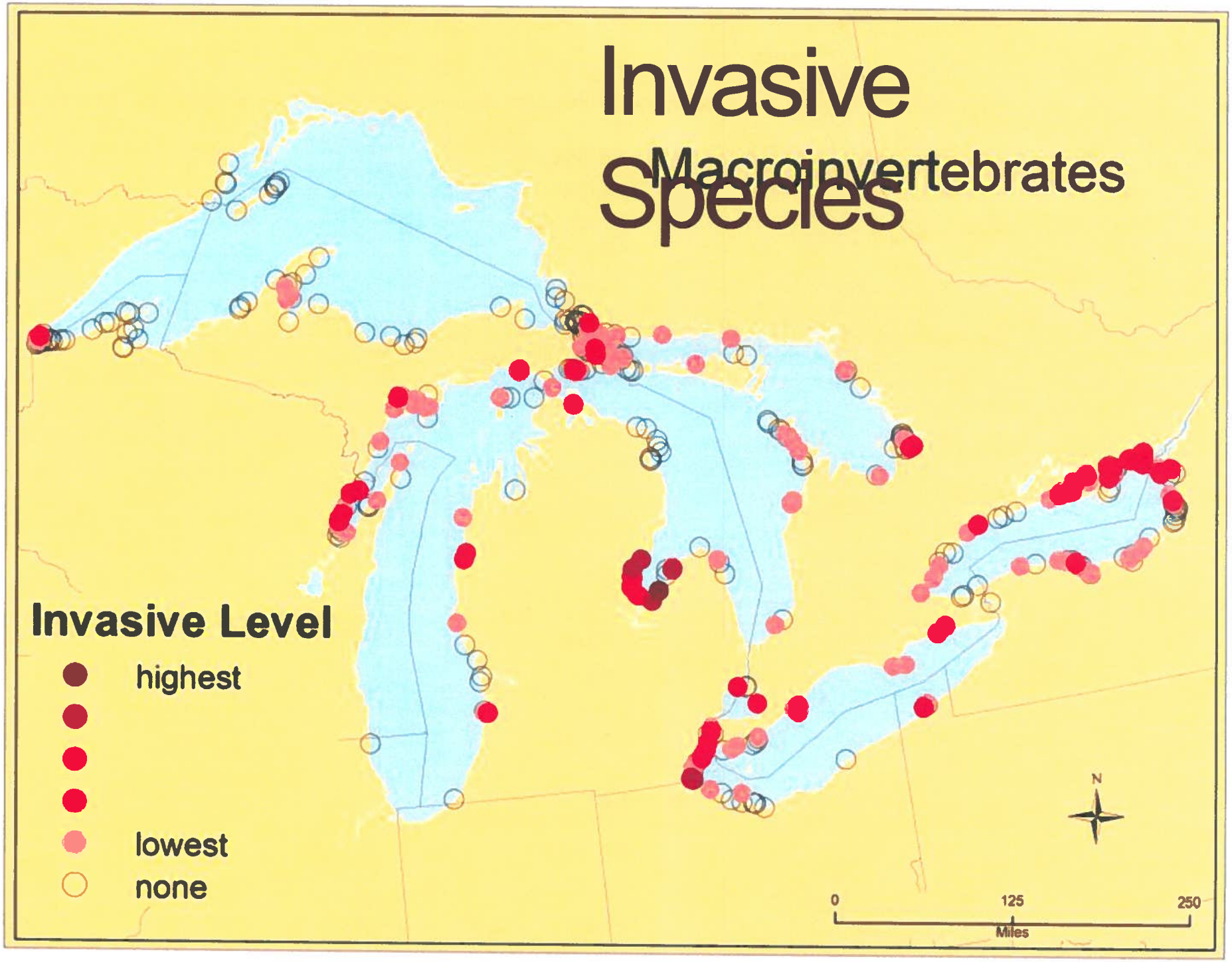
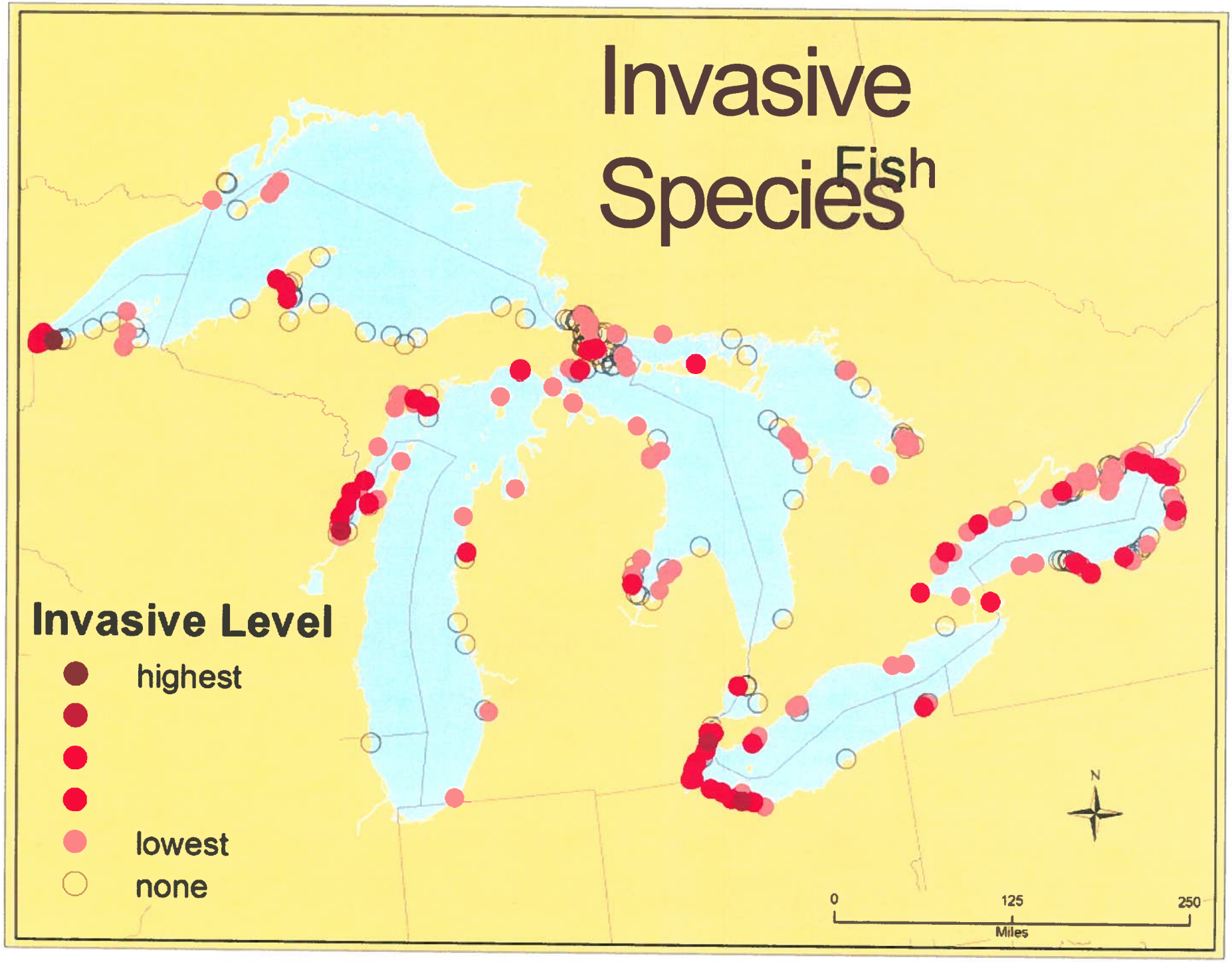
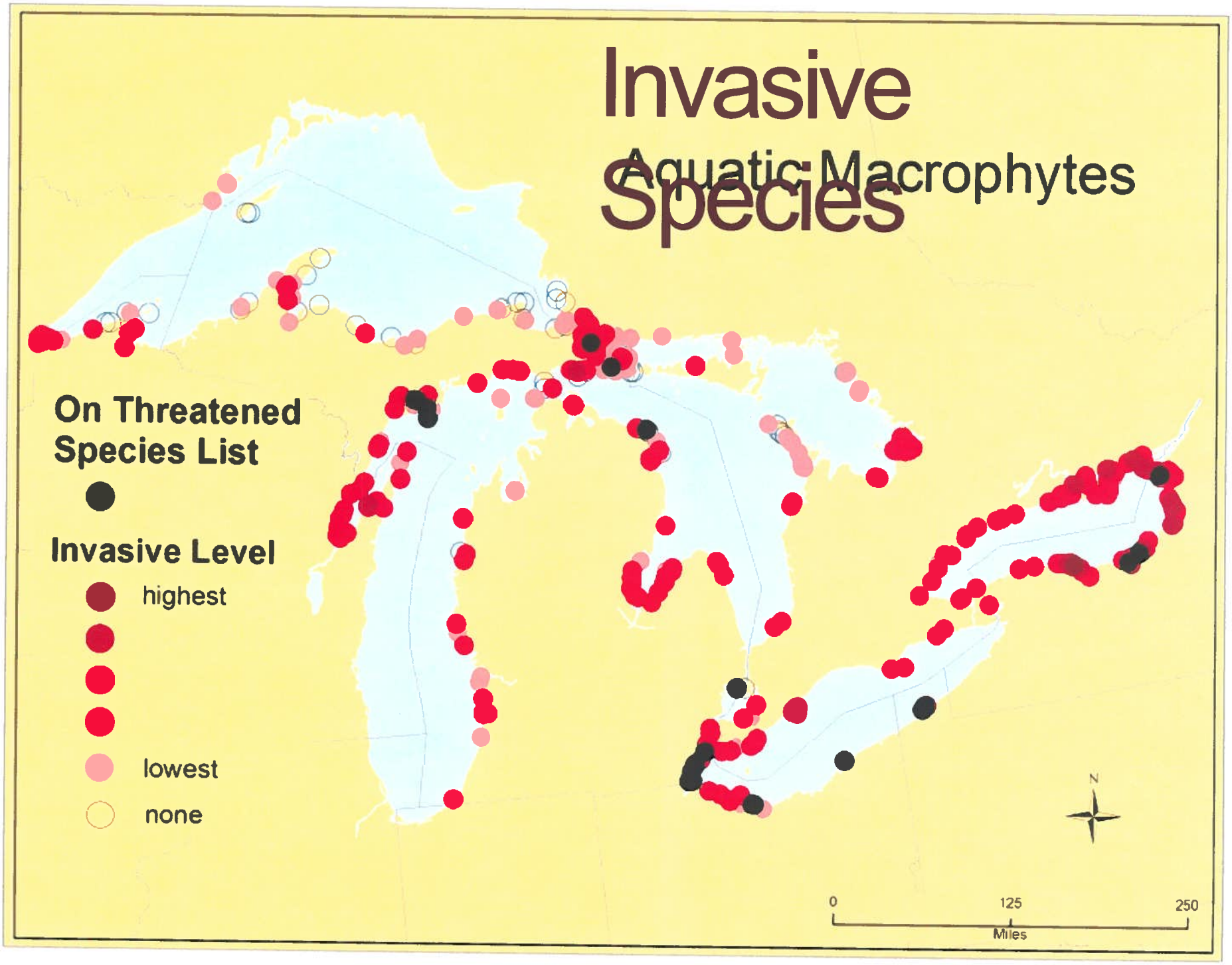
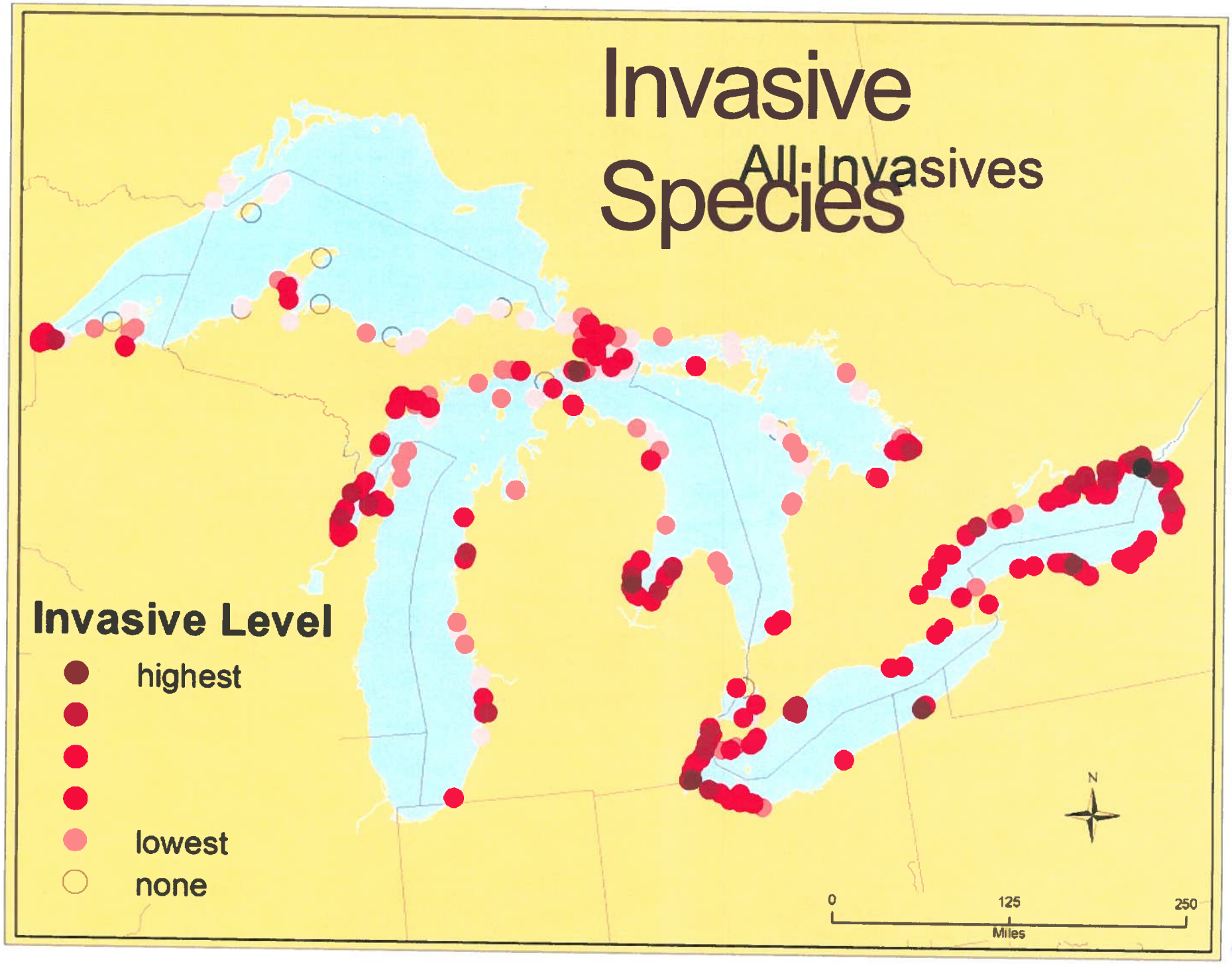
Results 2011, 2012, 2013




Invasive Species
Macroinvertebrates
Invasive Level
highest
lowest
none
N
0
125
250
Miles


Invasive Species
Fish
Invasive Level
highest
lowest
none
N
0
125
250
Miles

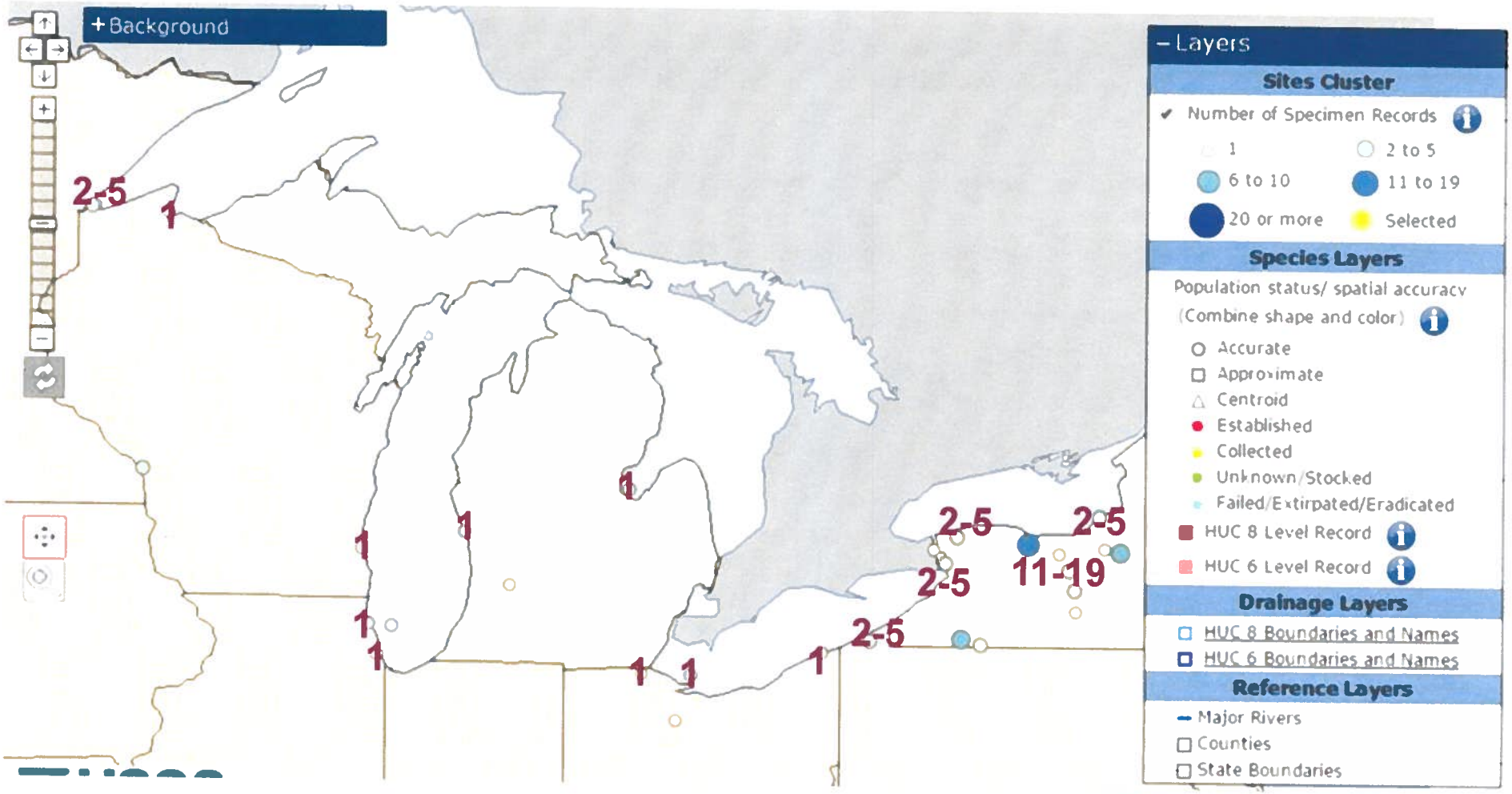

Invasive
Aquatic Macrophytes
Species
On Threatened
Species List
Invasive Level
highest
lowest
none
N
0
125
250
Miles


Invasive Species
All Invasives
Invasive Level
highest
lowest
none
N
0
125
250
Miles

Faucet Snail (*Bithynia tentaculata*)

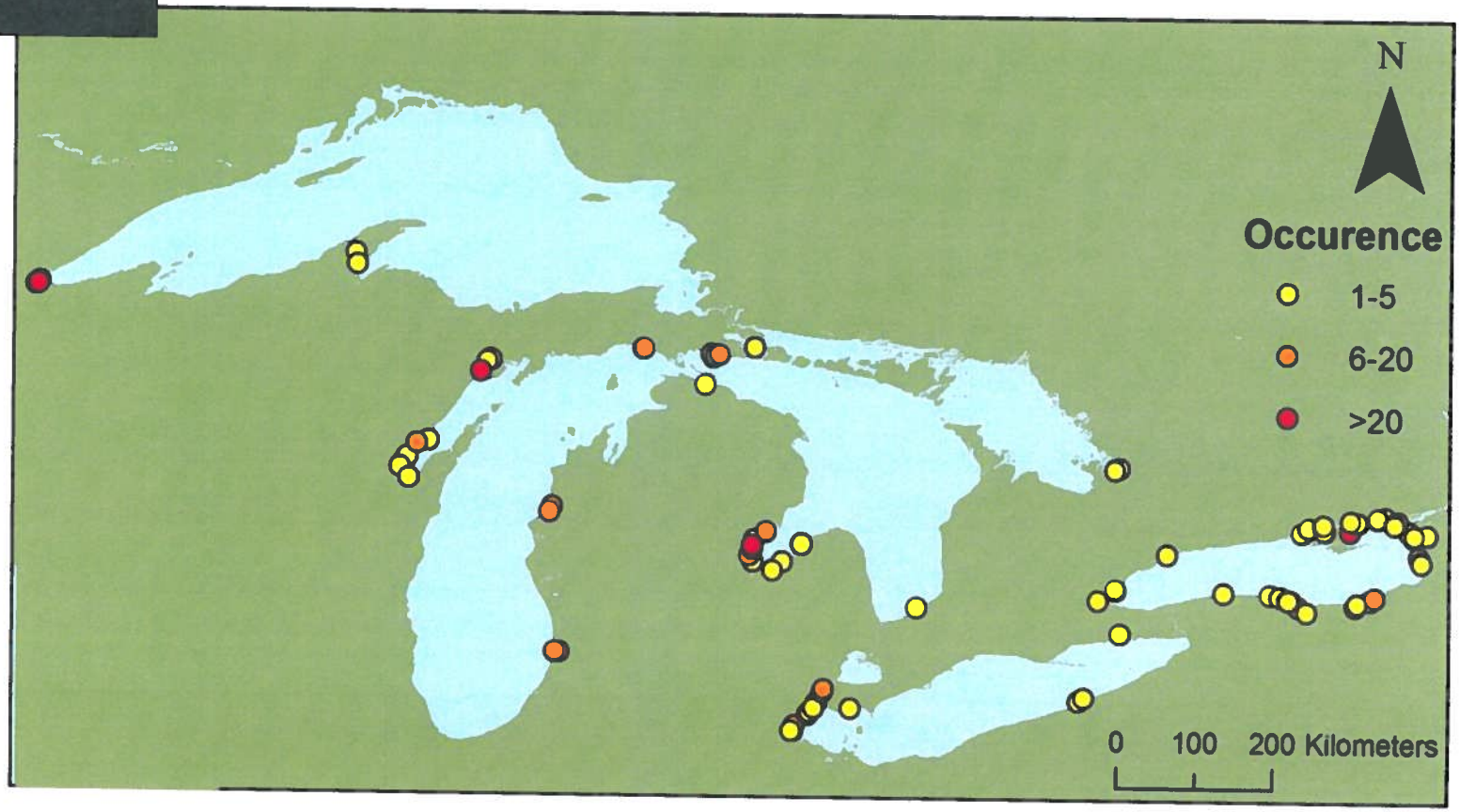
- Introduced through shipping hard ballast (1870's)
- Host for three intestinal trematodes, or flukes
- Waterfowl consume
  - Adult trematodes attack the internal organs
- Where known to Exist in MN
  - Responsible for 9000 Birds Killed in 07-08 Alone
- Was Not Thought to Be Widespread In the Great Lakes

USGS Current Documentation
Faucet Snail (*Bithynia tentaculata*)

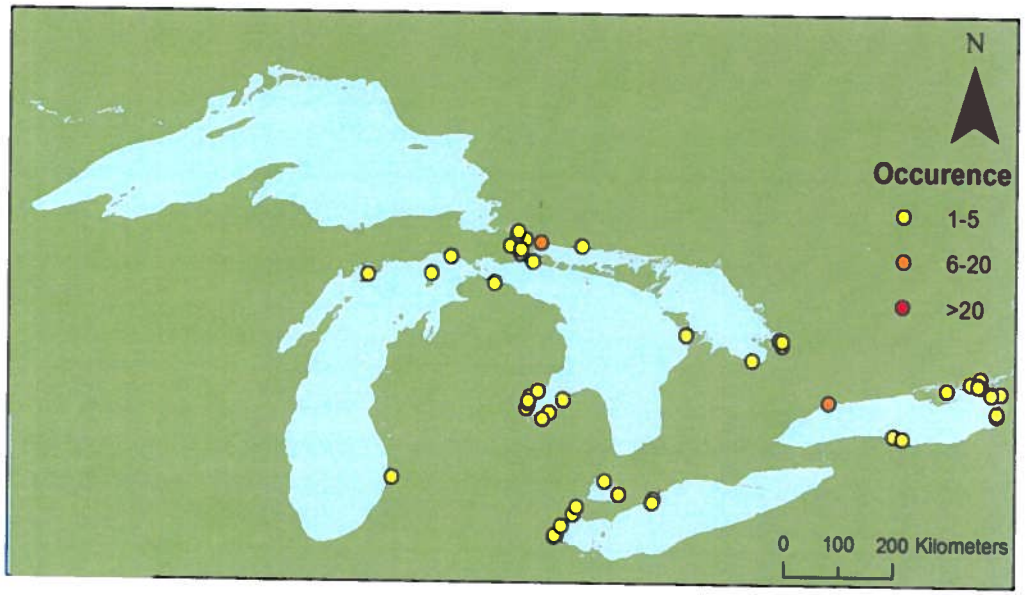


Faucet Snail (*Bithynia tentaculata*)

Documented by Coastal Wetland Monitoring

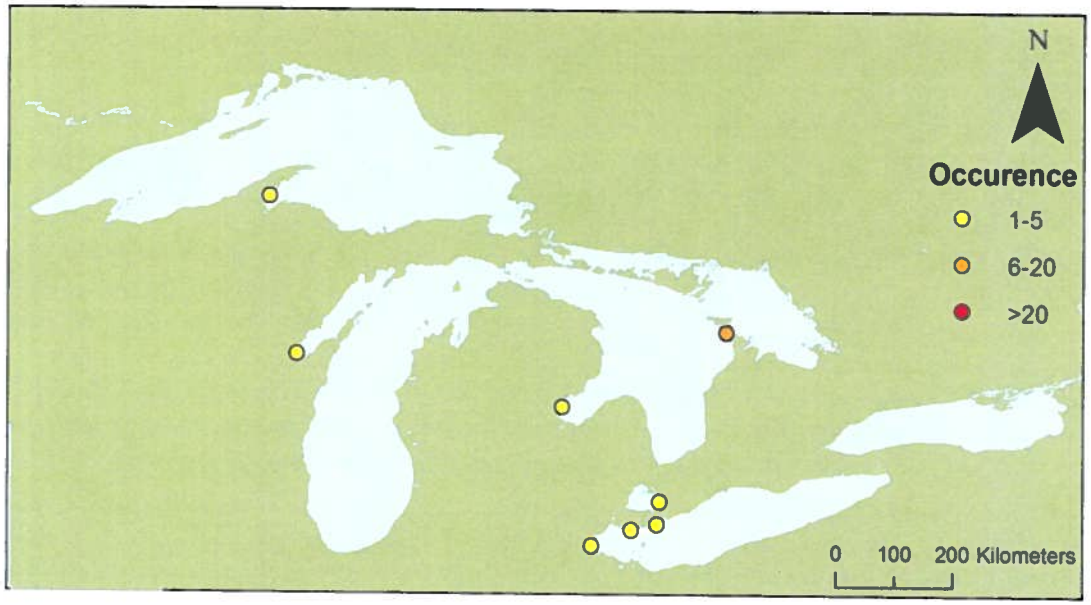


Water Veneer Moth (Acentria)



- Introduced through the import of European plants
- Aggressive herbivorous
- Decrease SAV populations
- Herbivore induced plant senescence
- Degrade productive fish habitats

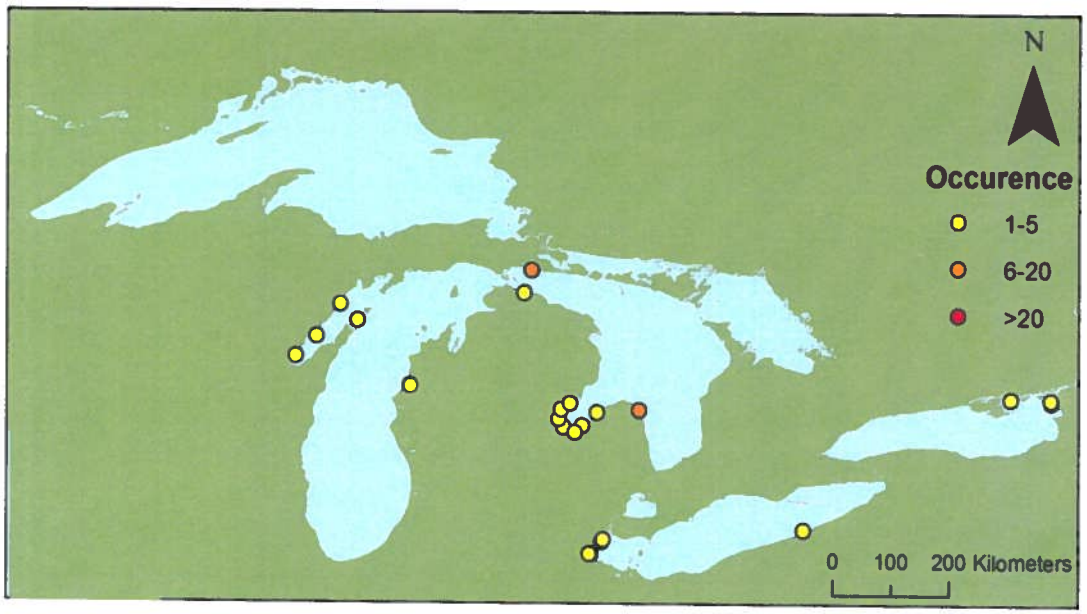
Japanese Mystery Snail
(*Cipangopaludina*)



- Introduced to Great Lakes through the aquarium trade in 1930's
- Potential vectors for the transmission of disease
- Highly competitive with native Gastropods

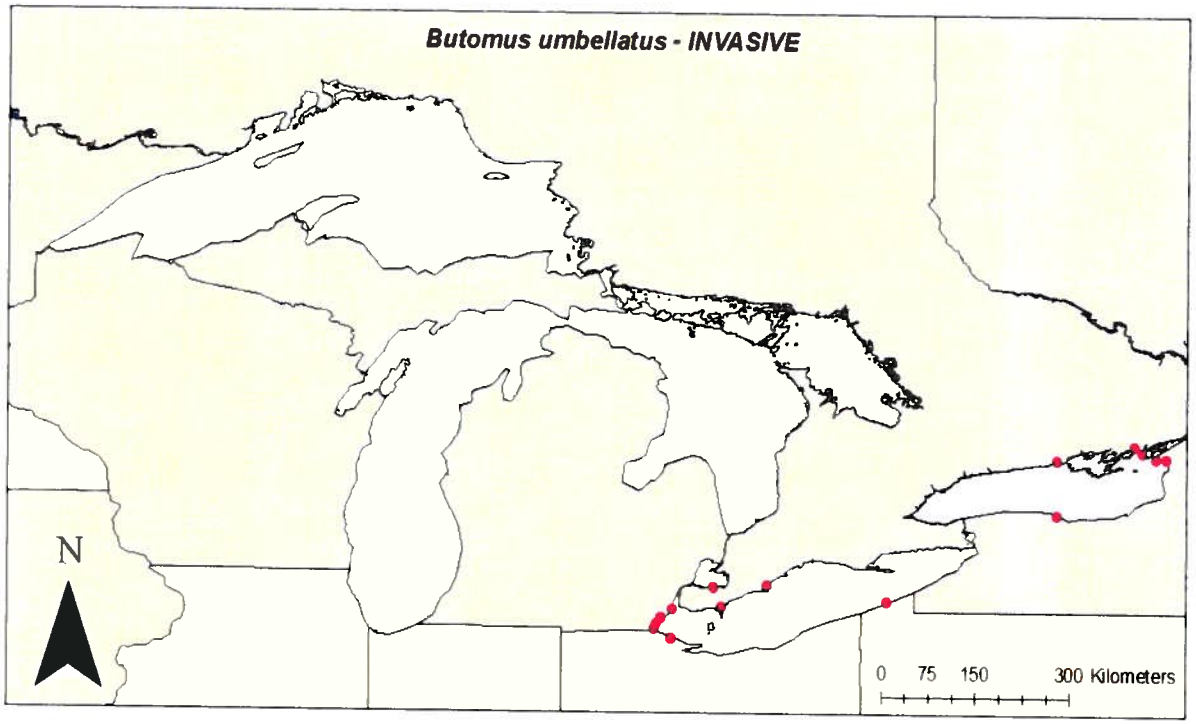
Amphipod

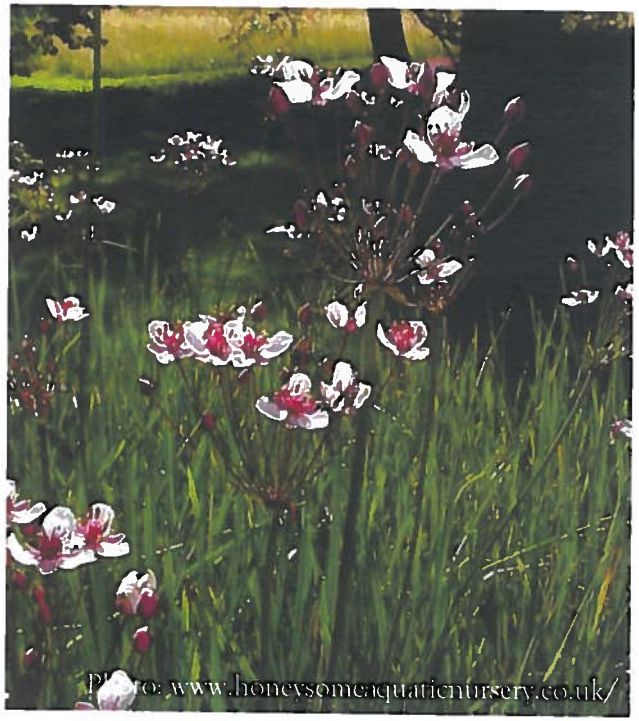
(Echinogammarus)



- Introduced through shipping ballast water (1994)
- Ponto-Caspian Origin
- Displaces native crustaceans
- May Result in Possible Local Extinction of Native Species

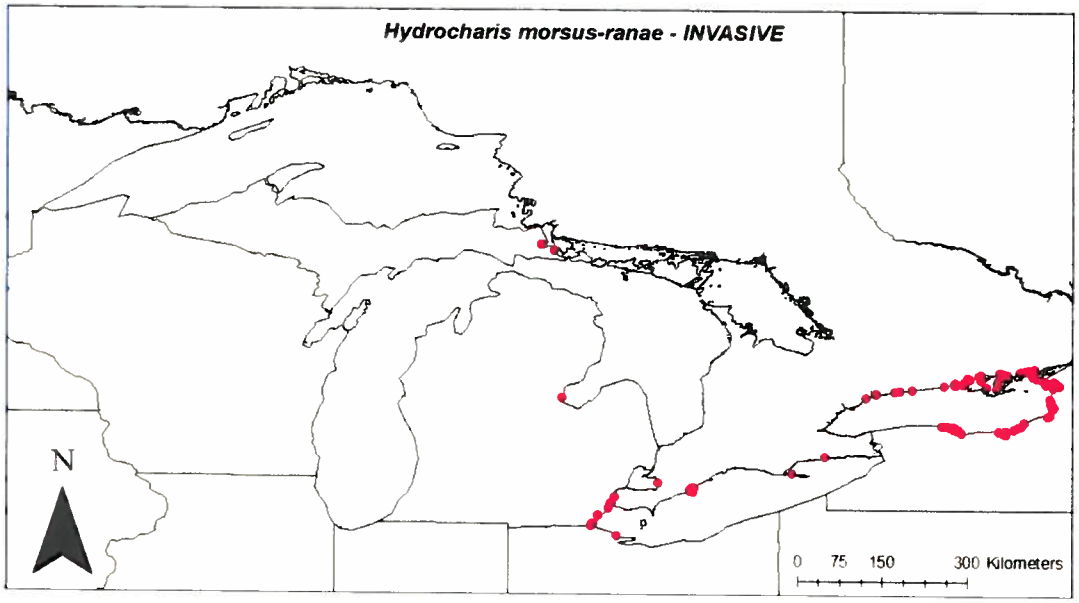
Flowering Rush (*Butomus umbellatus*)





- Native to Eurasia
- Introduced as an ornamental (early 1900's)
- Highly competitive and can tolerate deep water (9 ft)
- Displace native plant communities

European Frog-Bit (*Hydrocharis morsus-ranae*)

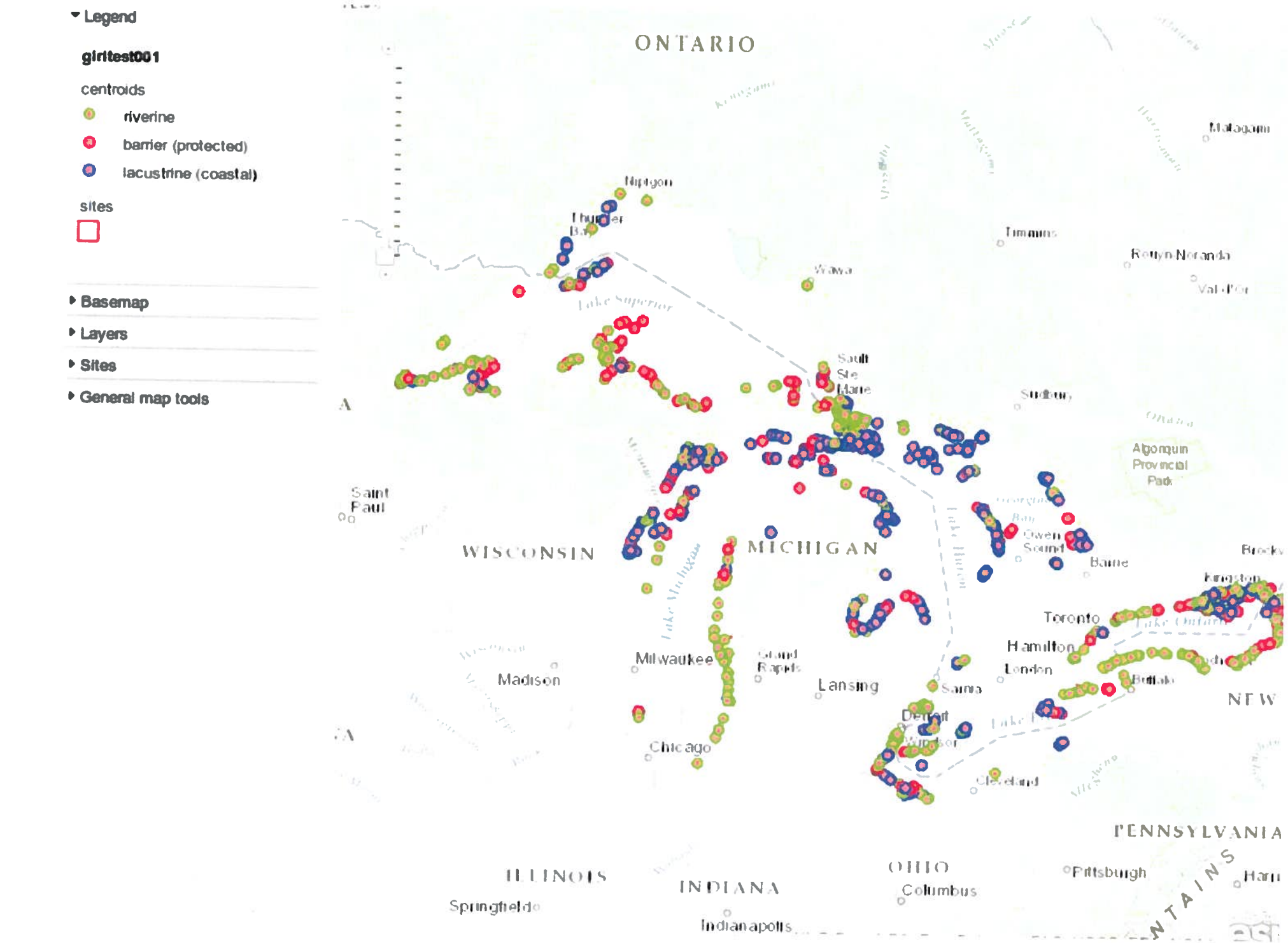


- Native to Eurasia
- Introduced through experimental trials (1932)
- Free floating dense mats that are highly competitive
- Elevated productivity can deplete oxygen levels causing fish kills

great lakes cwm coastal wetland monitoring

Welcome to the Great Lakes Coastal Wetland Monitoring Project (CWM) data website.

This project is sampling Great Lakes coastal wetland biota, habitat, and water quality to provide information on coastal wetland condition using fish, birds, calling amphibians,


Legend
girltest001
centroids
riverine
barrier (protected)
lacustrine (coastal)
sites
Basemap
Layers
Sites
General map tools
ONTARIO
Nipigon
Thunder Bay
Timmins
Kenyon-Noranda
Wawa
Lake Superior
Sault Ste Marie
Sudbury
Algonquin Provincial Park
Saint Paul
WISCONSIN
MICHIGAN
Owen Sound
Barrie
Toronto
Lake Ontario
Hamilton
London
Milwaukee
Grand Rapids
Madison
Lansing
Sarnia
Detroit
Windsor
Chicago
Cleveland
NEW
PENNSYLVANIA
ILLINOIS
INDIANA
OHIO
Columbus
Pittsburgh
Springfield
Indianapolis

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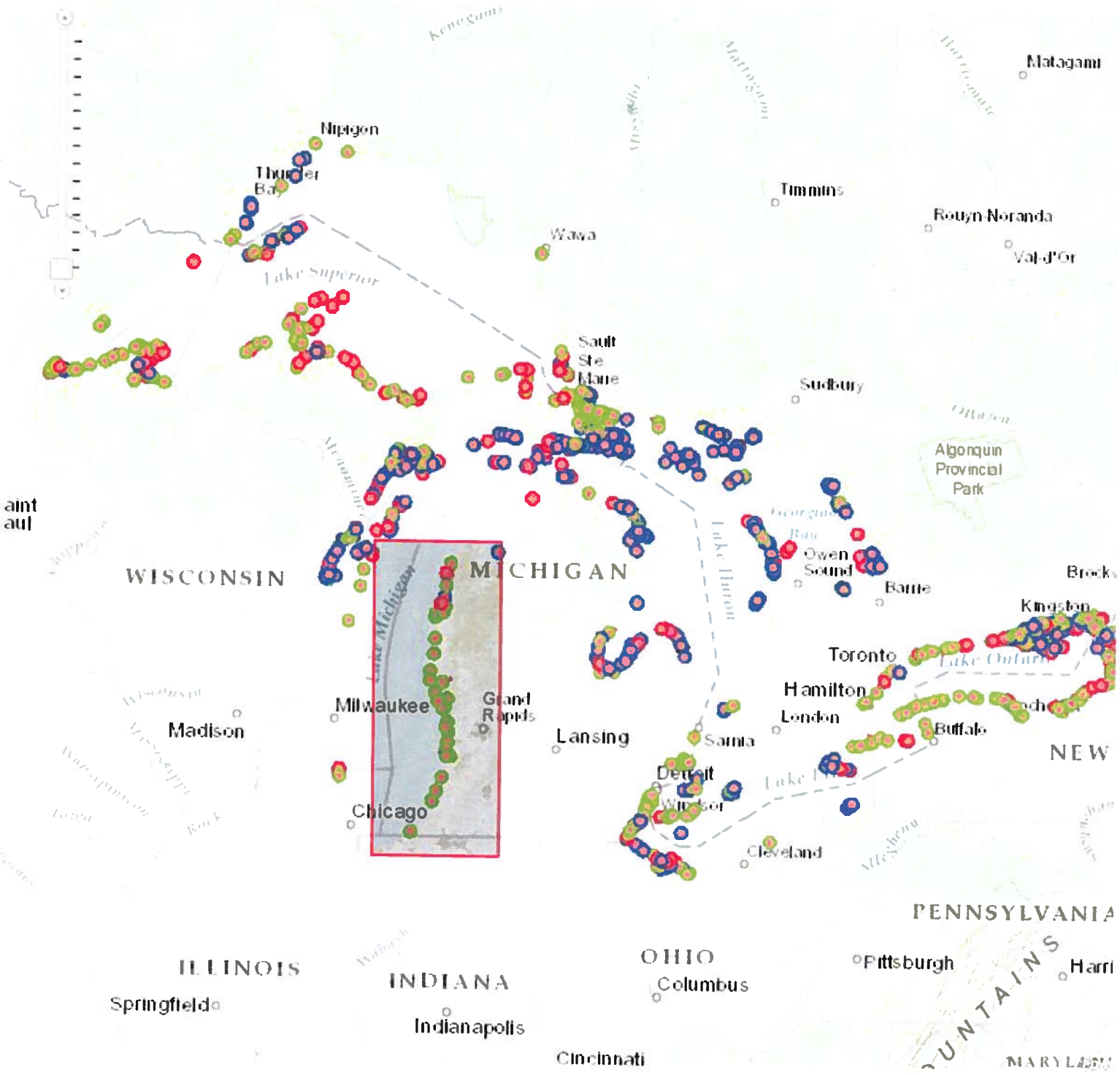


Imagery
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Light Gray Canvas
Pentwater
Hart
Shelby
Hesperia
Fremont
Montague
Whitehall
Muskegon
Manistee National Forest

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- riverine
- barrier (protected)
- lacustrine (coastal)

es

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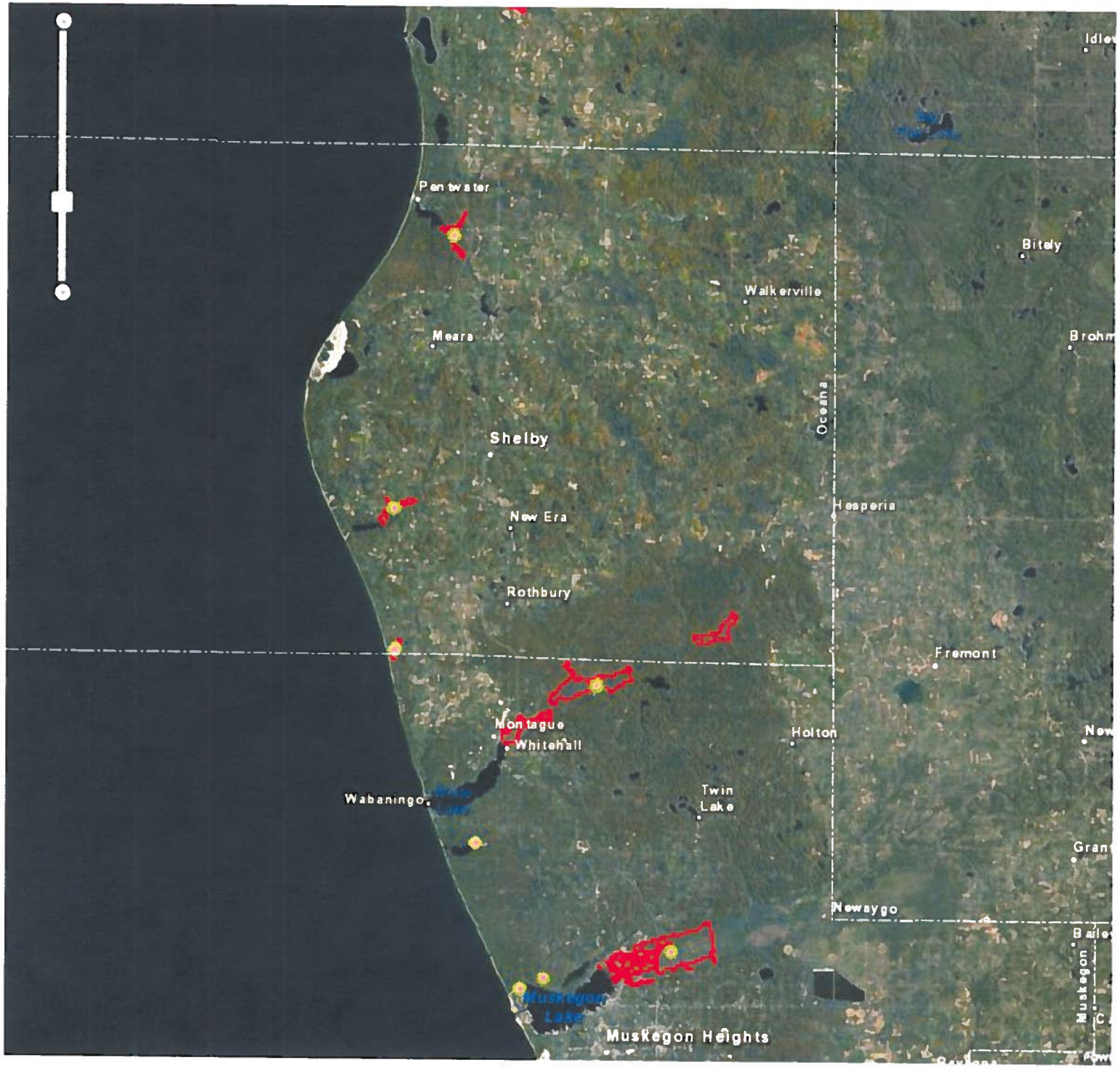

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barrier (protected)

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ltest001

itroids

riverine

barrier (protected)

lacustrine (coastal)

es

semap

yers

es

neral map tools

Species for site 1303

amphibian

Chorus Frog (Western/Boreal)
Spring Peeper

bird

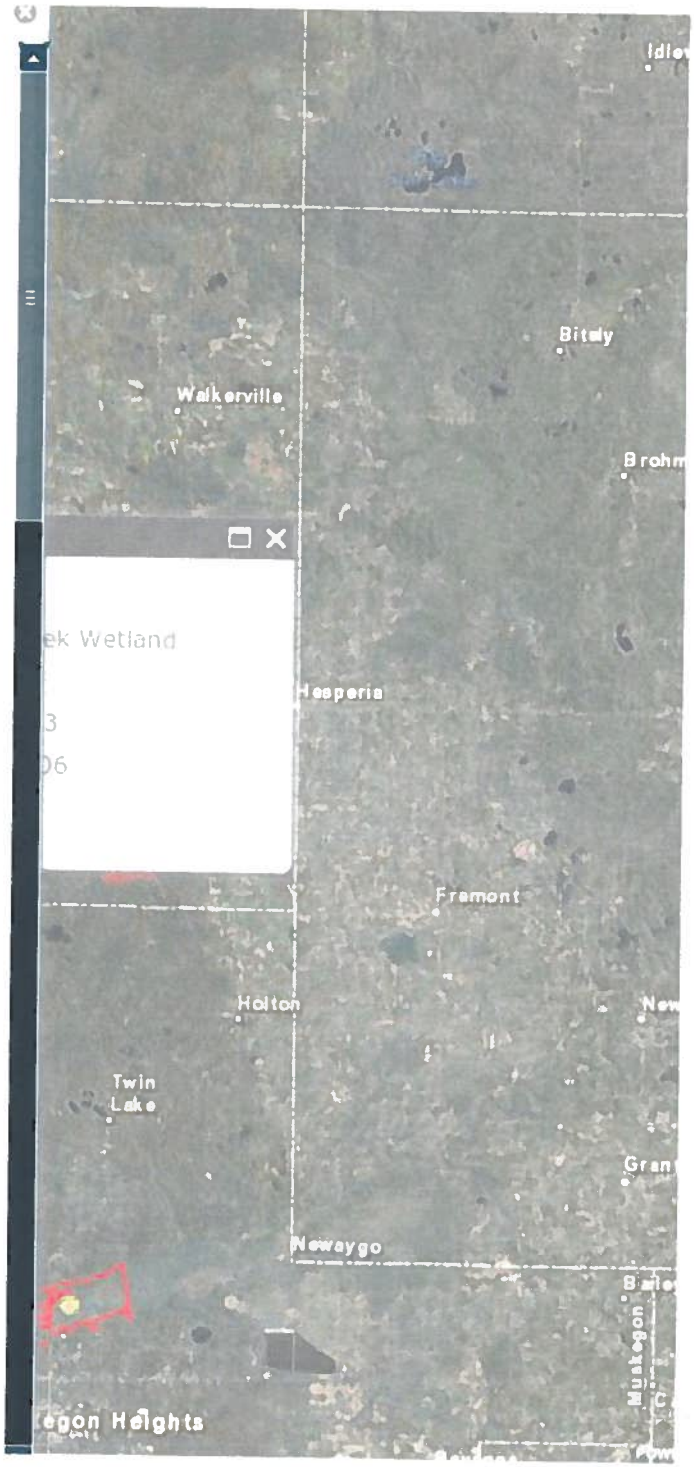
Alder Flycatcher
American Crow
American Goldfinch
Barn Swallow
Black-capped Chickadee
Blue Jay
Chestnut-sided Warbler
Red-winged Blackbird

fish

Black Crappie
Bluegill Sunfish
Brown Bullhead
Eastern Snapping Turtle
Largemouth Bass
Northern Rock Bass
Painted Turtle
Pumpkinseed Sunfish
Yellow Perch

invertebrate

Anax
Anopheles
Belostoma
Bezzia
Buenoa
Caecidotea
Caenis
Callibaetis
Carabidae
Chaulio[illegible]



http://greatlakeswetlands.org/

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thinking forward

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Bird Studies Canada / Études d'oiseaux Canada

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